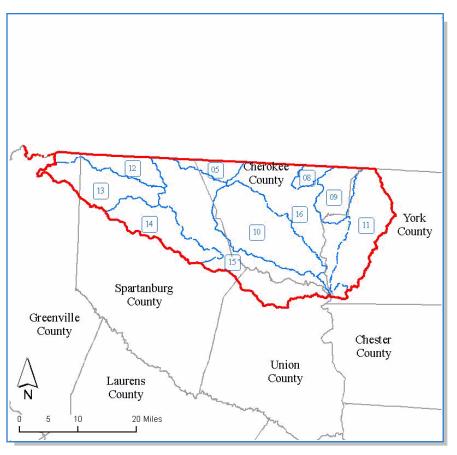
An Assessment of the Upper Broad Subbasin

Hydrologic Unit Code (8 Digit): 03050105





WATERSHED (10-digit HUC)

(E.g., 01 = 0305010501)

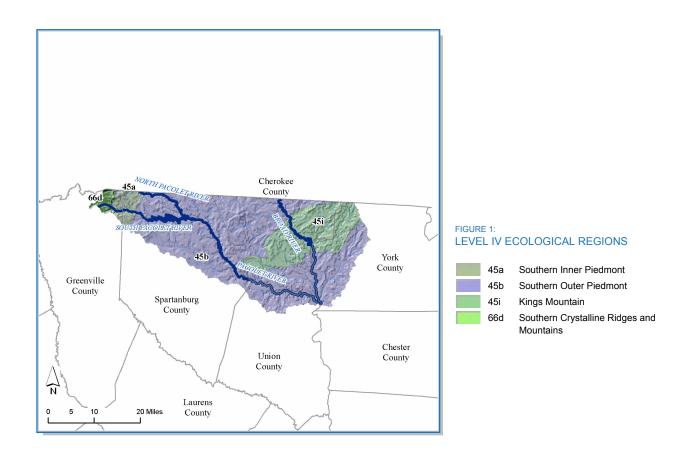
- Sandy Run-Broad River
- 08 Buffalo Creek
- 09 Kings Creek
- 10 Thicketty Creek
- 11 Bullock Creek
- North Pacolet River
- 13 South Pacolet River
- 14 Lawsons Fork Creek
- 15 Pacolet River
- 16 Cherokee Creek-Broad River



Watershed Description

The Upper Broad Subbasin extends from North Carolina into the northern border of South Carolina. The Broad River itself originates in the Blue Ridge foothills in Buncome County, North Carolina, and flows generally south and east. The Broad is dammed in North Carolina to form lake Lure. In South Carolina, the Upper Broad subbasin's exits into the lower Broad subbasin at the confluence of the Broad and Pacolet rivers. The subbasin (on the South Carolina side) drains 965 square miles or 617,612 acres.

The subbasin lies in the Blue Ridge (66) and Piedmont (45) ecoregions (Figure 1). A brief description of the Level III ecoregions in this watershed is available in this document's appendix. A more detailed description of the Level III and Level IV Common Resource Areas (Ecological Regions) is available online (See Griffith *et al.* 2002 in References section.).



Land Use/Land Cover

Spartanburg and Gaffney are the most prominent urban areas in the subbasin (Figure 2). Note that two interstates, the I-85 and the I-26, traverse the subbasin (Figure 2) and are potential urban growth points. A fair amount of agricultural land exists in the watershed (Figure 2), much devoted to pasture and hayland. However, this area is also well-known for peach orchards.

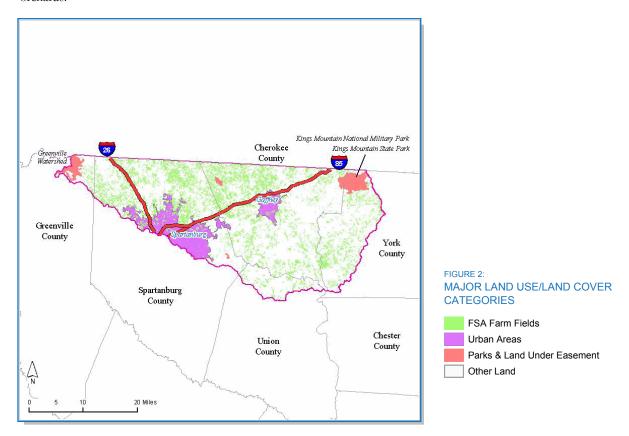


Table 1:
MAJOR LAND USE/LAND COVER CATEGORIES

WAJON LAND OSE/LAND COVER OAT LOOKIES	Acres	% of Watershed
Watershed (Total)	617,162	-
Urban Area	58,959	10%
Parks/Land Under Easement (not NRCS)	17,901	3%
Farm Service Agency Designated Farm Fields	118,549	19%

Table 2:

AGRICULTURAL LAND USE: FSA ACREAGE AND ESTIMATED FARM FIELD USE FROM THE 2002 AG CENSUS (NASS Whole County Data Used. Cropland includes: Field Crops, Orchards, and Specialty Crops.)

County	FSA Fields (Acres)	% Pasture (Estimated)	% Cropland (Estimated)	% Hayland (Estimated)
Cherokee	51,567	36%	26%	38%
Greenville	1,665	40%	32%	28%
Spartanburg	45,776	36%	30%	34%
Union	4,062	47%	18%	35%
York	15,480	39%	25%	36%

Summary of Resource Concerns

The following is a summary of resource concerns for the watershed. Each resource concern has a more detailed analysis provided in its corresponding section.

Soils

Land capability limitations are dominated by erosion in this subbasin that is typical of an area within the Piedmont and Blue Ridge Mountains; highly erodible and potentially highly erodible soils comprise 91% of the subbasin and are the key resource concerns.

Water Quantity

Awaiting SCDNR's 2007 state water assessment.

Water Quality

Fecal coliform and biological (benthic invertebrate) impairments.

Plant Condition

The most prominent crops in the subbasin include orchard crops, corn silage, sorghum for grain, forage, and nursery stock.

Fish, Wildlife, and Native Plants

According to SC DNR's "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section), the following applies to this subbasin: Biologists have identified habitat protection as one of the most important actions to ensure the protection of South Carolina priority species. Loss and fragmentation of habitat have been identified as a major threat to many of the species listed as threatened and endangered in South Carolina.

Domestic Animals

Grazing livestock populations are modest. Confined operations (mainly turkey and swine) are located the east of the subbasin.

Economic and Social Factors

Urbanization along the I-26 and I-85 corridors is a concern impacting various resources, probably resulting in a significant loss of cropland in the subbasin between 1997 and 2002.

Progress on Conservation

Table 3:

A SUMMARY OF NRCS APPLIED CONSERVATION TREATMENTS (ACRES)

(See Appendix for NRCS Conservation Practices used for Conservation Treatment Categories.) (Applied practice data is reported on a fiscal year basis commencing on October 1st)

Conservation Treatments	2004	2005	2006	Total
Buffers and Filter Strips	53	-	40	93
Conservation Tillage	33	105	251	389
Erosion Control	490	843	638	1,971
Irrigation Water Management	8	13	22	43
Nutrient Management	429	969	686	2,084
Pest Management	436	815	715	1,966
Prescribed Grazing	411	221	70	702
Trees and Shrubs	418	617	579	1,614
Wetlands	-	-	-	-
Wildlife Habitat	164	-	195	359

Table 4:

LANDS REMOVED FROM PRODUCTION BY FARM BILL PROGRAMS (WHOLE COUNTY DATA SHOWN)

County	Conservation Reserve Program (ac) 2005	Conservation Reserve Program (ac) 1986 - 2005	Grassland Reserve Program (ac) 2005	Farmland & Ranch Protection Program (ac) 2005	Wetland Reserve Program (ac) 2005
Cherokee	1,863	68,766	-	-	-
Greenville	879	25,038	-	-	9
Spartanburg	1,782	48,405	-	-	-
Union	636	14,478	-	-	125
York	924	24,924	-	-	-

Table 5:

APPROVED TOTAL MAXIMUM DAILY LOAD (TMDL)

(See SCDHEC 2007 (a) in Reference Section.) - SCDHEC Contact: Matt Carswell - (803) 898-3609

TMDL Document	Number of Stations	Parameter of Concern	Status	WQMS ID Standard Attained
Upper Broad River	35	Fecal Coliform	Completed & Approved	B-056, B-330, B-331, B-334

Table 6:

OTHER PLANS, ASSESSMENTS, AND PROJECTS IN THE WATERSHED

Organization	Description	Contact	Telephone
SCDNR	Broad Scenic River Project	Mary Crockett	803-734-9111
SCDHEC	Watershed Water Quality Assessment: Broad River Basin (2001)	Richelle Tolton	803-898-4213
USGS	Santee National Water Quality Assessment (NAWQA) project	Celeste A. Journey	803-750-6141

Other Watershed Considerations

Soils

The Upper Broad subbasin contains two major land resource areas: the Blue Ridge (Southern Crystalline Ridges and Mountains) which makes up about 5% of the subbasin, and the Piedmont region (Southern Inner/Outer Piedmont and Kings Mountain) which comprises the remaining 95%. Most of the land (91%) in this subbasin has limitations due to erosion (Table 7). Most of the erosion is associated with sloping areas on uplands in the subbasin (Figure 4, Table 9). Low soil organic matter in the highly erodible soils is a soil health concern. Hydric soils and wetness are not major resource concerns in this subbasin with 93% of the land classified as not hydric (Figure 5, Tables 7 and 10). Almost all of the hydric and potentially hydric soils occur in riparian areas. Almost 40% of the land in the Upper Broad subbasin is either prime farmland (20%) or statewide important farmland (17%) and occurs mostly in the western part of the subbasin (Figure 3, Table 8).

Table 7: LAND CAPABILITY CLASSES (See NRCS 2007 [a] and [b] in References section.)

Percentages are based on the whole watershed (617,162 ac).

Land Capability Class 1	Acres	Percent
1 - Slight limitations	144	0%

% Land by Subclass Limitation

	Erosi	on (e)	Wetn	ess(w)	Drough	tiness (s)
Land Capability Classes 2-8	Acres	Percent	Acres	Percent	Acres	Percent
2 - Moderate limitations	123,516	20%	17,523	3%	-	-
3 - Severe limitations	126,825	21%	17,627	3%	540	0%
4 - Very severe limitations	122,184	20%	7,608	1%	-	-
5 - No erosion hazard, but other limitations	-	-	7,582	1%	-	-
6 - Severe limitations; unsuitable for cultivation; limited to pasture, range, forest	86,439	14%	-	-	151	0%
7 - Very severe limitations; unsuitable for cultivation; limited to grazing; forest, wildlife habitat	96,359	16%	-	-	1,067	0%
8 - Miscellaneous areas; limited to recreation, wildlife habitat, water supply	-	-	209	0%	586	0%

Prime Farmland



FIGURE 3: PRIME FARMLAND (See NRCS 2007 [a] and [b] in References section.)

Table 8: PRIME FARMLAND

Prime Farmland Categories	Acres	Percent of Land
All areas are prime farmland	110,793	18%
Farmland of statewide importance	107,616	17%
Not prime farmland	384,556	62%
Prime farmland if drained	0	0%
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	3,043	0%
Prime farmland if irrigated	0	0%
Prime farmland if irrigated and drained	0	0%
Prime farmland if protected from flooding or not frequently flooded during the growing season	10,784	2%

Highly Erodible Land

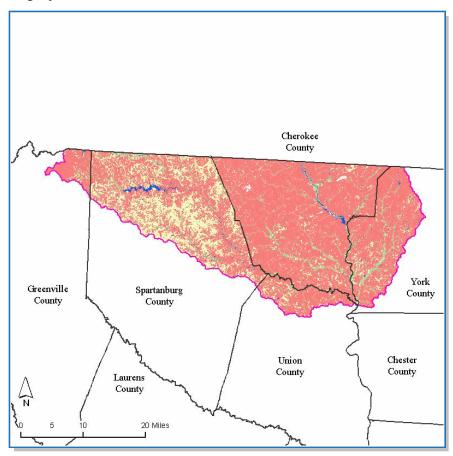


FIGURE 4: HIGHLY ERODIBLE LAND (See NRCS 2007 [a] and [b] in References section.)

Table 9: HIGHLY ERODIBLE LAND

Highly Erodible Land Categories	Acres	Percent of Watershed
Highly erodible land	461,861	75%
Not highly erodible land	46,987	8%
Potentially highly erodible land	100,555	16%

Hydric Soils

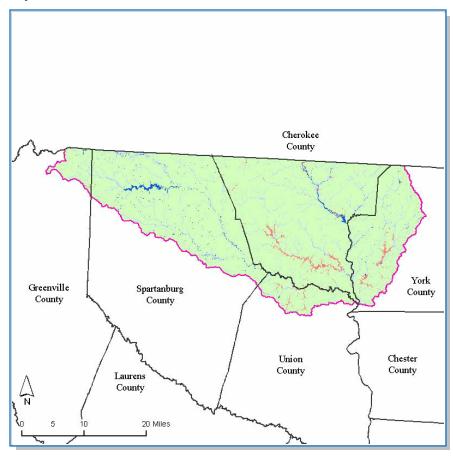


FIGURE 5: HYDRIC SOILS (See NRCS 2007 [a] and [b] in References section.)

Table 10: HYDRIC SOILS

Hydric Soils Categories	Acres	Percent of Watershed
All Hydric	8,091	1%
Not Hydric	574,461	93%
Partially Hydric	34,239	6%

Water Quantity

Narrative awaiting SCDNR's new state water assessment.

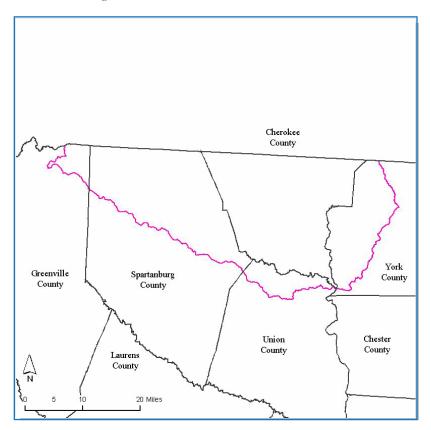


FIGURE 6: WATERSHED RELATIVE TO CAPACITY USE AREAS, NOTICE OF INTENT AREAS, AND CONES OF DEPRESSION

Table 11:
CAPACITY USE, NOTICE OF INTENT, AND CONES OF DEPRESSION AREA IN WATERSHED (See SCDHEC 2007 [c] and SCDNR 2004 in Refrerences Section.)

Area	Percent of Watershed
% Watershed in Cone of Depression and Capacity Use (CU) Area	0%
% Watershed in SCDHEC Capacity Use (CU) Area	0%
% Watershed in SCDHEC Notice of Intent (NOI) Area	0%

Water Quantity Cont.

Table 12: INDICATORS OF IRRIGATION WATER USAGE (WHOLE COUNTY DATA ARE USED) (See NASS 2002 and SCDNR 2004 in References Section)

County	Total Irrigated Water Used MGD	Total NASS Cropland (ac)	Cropland Under Irrigation (ac)	Percent Cropland Under Irrigation	Water Use Gal/Ac/Day for Irrigated Land
Cherokee	1.75	25,279	442	1.7	3,959
Greenville	5.11	38,394	1,760	4.6	2,903
Spartanburg	3.13	59,333	1,908	3.2	1,640
Union	0.76	15,580	147	0.9	5,170
York	1.00	54,017	757	1.4	1,321

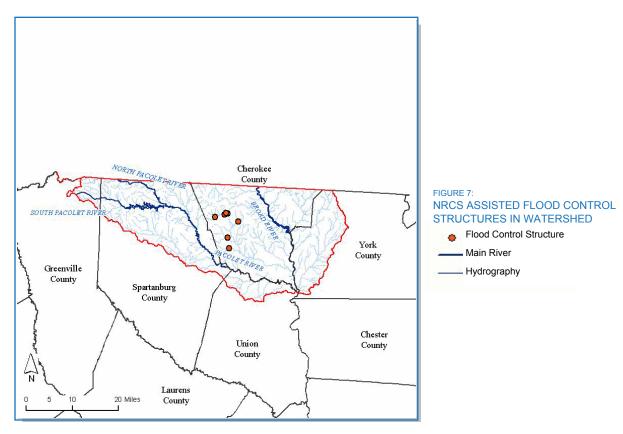


Table 13: NRCS IMPLEMENTED FLOOD CONTROL STRUCTURES

Number of Structures	Maximum Storage	N	Number of Structures by Hazard Class				
(in Watershed)	(AcFt)	High	Low	Significant	Unclassified		
7	12,182	0	4	3	0		

Water Quality

The number of surface water quality impairments is shown in Table 15 resulting in a "303(d)" listing of that Water Quality Monitoring Site (WQMS). Table 5 indicates what progress has been made to address surface water quality through the Total Maximum Daily Load (TMDL) process. Once a TMDL plan is approved, the WQMS is removed from the 303(d) list even though the standard may not have been attained. Note that standards for total nitrogen, total phosphorus, and chlorophyll-a only exist for lakes; therefore, no stream in the state can be listed for any of these three parameters.

The fecal coliform concern will be addressed through ongoing TMDLs (Table 5). The other primary water quality concern is related to biological (benthic invertebrate) impairments (Table 15).

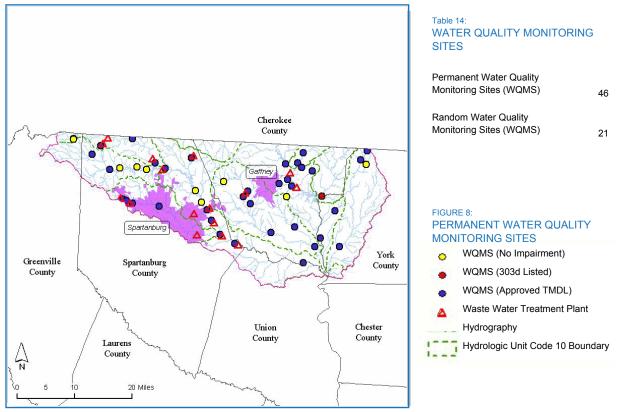


Table 15: NUMBER OF MONITORING SITES SHOWING SURFACE WATER QUALITY IMPAIRMENTS (See SCDHEC 2006 in References for the state 303(d) list.)

Recreational Use Standard		Fish Tissue Standa	Fish Tissue Standard		Shellfish Harvest Standard		
Parameter	Impairments	Parameter	Impairments	Parameter	Impairments		
Fecal Coliform	5	Mercury	0	Fecal Coliform	NA		
		PCB's	0				
Aquatic Life Use	Standard						
Parameter	Impairments	Parameter	Impairments	Parameter	Impairments		
Biological	9	Dissolved Oxygen	2	Total Phosphorus	0		
Chlorophyll A	1	Ammonia Nitrogen	0	pН	2		
Chromium	0	Nickel	0	Turbidity	0		
Copper	3	Total Nitrogen	0	Zinc	0		

Plant Condition

Plants of Economic Importance

Plants of economic importance are shown in Table 16. The crops shown in this table are from NASS data where the top five crops, by acres, in each county are displayed. The timber statistics (see Clemson Extension Forest Services 2003 in References) indicate the relative importance of the timber industry within the state and the importance of the timber industry compared to agriculture within the county.

The most prominent crops in the subbasin include orchard crops, corn silage, sorghum for grain, forage, and nursery stock.

Native Plant Species

According to SC DNR's "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section), the following applies to this subbasin: Appalachian oak and oak pine forest are important to wildlife as the most extensive cover type in the Blue Ridge ecoregion. Scattered throughout the ecoregion are wet places embedded within primary habitat types such as cold water streams, waterfalls, waterslides and bogs.

The Piedmont ecoregion plant community historically consisted of oak and hickory-dominated forest with associated tree species varying by slope and soil moisture. This was the primary potential vegetation type in the Piedmont. Today due to land disturbances, the majority of these sites exist mostly in closed canopy pine-dominated forests.

Table 16:
WHOLE COUNTY DATA OF PLANTS OF ECONOMIC IMPORTANCE IN SUBBASIN
(See: USDA NASS 2002 & Clemson University Forest Extension Services 2003 in References section)

Plant	Counties
All Cotton	York
All Vegetables harvested	Union, Greenville
All Wheat for grain	Spartanburg, York, Union, Cherokee
Apples	Greenville
Corn for silage	Spartanburg
Forage - land used for all hay and haylage, grass silage, and greenchop	Spartanburg, York, Greenville, Cherokee, Union
Nursery stock	Greenville, Spartanburg
Oats	Cherokee
Peaches	Spartanburg, Cherokee
Short-rotation woody crops	York, Greenville, Union
Sorghum for grain	York
Soybeans	Cherokee
Timber Revenues Exceed Ag. Revenues	Union

Table 17: FEDERALLY LISTED THREATENED AND ENDANGERED PLANT SPECIES IN WATERSHED (See USFW 2006 in References section.)

Common Name	Latin Name	Status
Schweinitz's sunflower	Helianthus schweinitzii	Endangered
White irisette	Sisyrinchium dichotomum	Endangered
White fringeless orchid	Platanthera integrilabia	Supported Proposals to List
Swamp-pink	Helonias bullata	Threatened
Small whorled pogonia	Isotria medeoloides	Threatened
Rock gnome lichen	Gymnoderma lineare	Endangered
Mountain sweet pitcher-plant	Sarracenia rubra ssp. jonesii	Endangered
Little amphianthus	Amphianthus pusillus	Threatened
Georgia aster	Aster georgianus	Supported Proposals to List
Bunched arrowhead	Sagittaria fasciculata	Endangered
Dwarf-flowered heartleaf	Hexastylis naniflora	Threatened

Fish and Wildlife

For additional information, the SC Department of Natural Resources has completed a "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section).

In 2005, mercury advisories were issued for 57 water bodies in South Carolina. Higher concentrations of mercury in fish tissue tend to occur in the Coastal Plain of South Carolina with relatively lower concentrations (and therefore fewer advisories) in the Piedmont. For more details on fish advisories, please refer to the SCDHEC fish advisory website at: http://www.scdhec.gov/environment/water/fish/

Table 18:
FEDERALLY LISTED THREATENED AND ENDANGERED WILDLIFE SPECIES IN WATERSHED (See USFW 2006 in References section.)

 Common Name
 Latin Name
 Status

 Bog turtle
 Clemmys muhlenbergii
 Threatened, Similarity of Appearar

Table 19:
FEDERALLY LISTED THREATENED AND ENDANGERED AQUATIC SPECIES IN WATERSHED (See USFW 2006 in References section.)

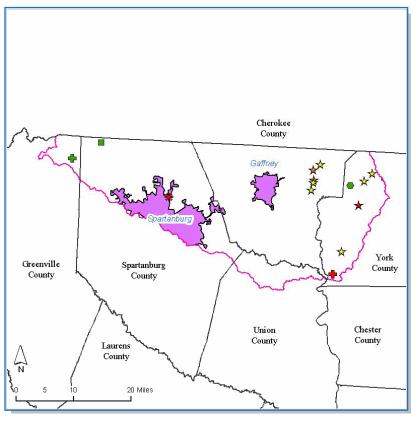
Common NameLatin NameStatusCarolina heelsplitterLasmigona decorataEndangered

Domestic Animals

Grazing livestock populations are modest. Confined operations (mainly turkey and swine) are located the east of the subbasin (Figure 9, Table 21).

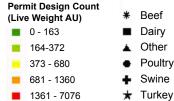
Table 20: WHOLE COUNTY GRAZING ANIMAL POPULATION DATA FROM 2002 AG. CENSUS (See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Cows/Calves	Grazing/Forage (ac)	County Rank in State
Cherokee	9,468	9,173	15
Greenville	11,077	15,375	14
Spartanburg	21,735	21,510	7
Union	7,134	7,268	(D)
York	19,211	20,958	5



CONFINED ANIMAL POPULATION [As given by SCDHEC] (Au = Animal Unit = 1,000 lbs) Beef Live Weight (Au) Dariy Live Weight (Au) Horse Live Weight (Au) Poultry Live Weight (Au) Swine Live Weight (Au) Turkey Live Weight (Au) 5,868

FIGURE 9: TYPE AND SIZE OF CONFINED ANIMAL OPERATION



ECONOMIC & SOCIAL FACTORS

The number of full-time farmers is similar to the state average of 47% and farm sizes are *smaller* than the state average of 197 ac (Table 22), suggesting average or below-average levels of participation in conservation programs in the subbasin. Farm sizes *decreased* by an estimated 10% between 1997 and 2002, whereas on average farm sizes decreased by 13% across the state for the same period. Loss of cropland between 1997 and 2002 is estimated at 11%, higher than the SC average of 8%.



The relative importance of crop and livestock commodity groups in the watershed is shown in Tables 24 and 25; a *qualitative* indication of the relative importance of timber is provided on Table 16.

For more economic and farm information from the 2002 Agricultural Census, more detailed reports for all South Carolina counties can be found at:

http://www.nass.usda.gov/census/census02/profiles/sc/index.htm

Table 22: 2002 FARM CENSUS DATA (WHOLE COUNTY DATA SHOWN) (SC average farm size = 197 ac)

County	Total Number of Farms	% Full Time Farmers	% Farms > 180 (ac)	Average Farm Size (ac)
Cherokee	430	45%	21%	149
Greenville	909	43%	12%	96
Spartanburg	1,412	46%	12%	90
Union	299	49%	28%	170
York	858	45%	19%	139
Weighted Avg*	865	45%	17%	123

Table 23: 2002 FARM CENSUS ECONOMIC DATA (WHOLE COUNTY DATA SHOWN) (Results in \$1,000)

County	Market Value of Ag Products Sold	Market Value of Crops Sold	Market Value of Livestock, Poultry, and Their Products	Farms with sales < \$10,000
Cherokee	23,990	1,890	22,100	358
Greenville	18,154	14,873	3,281	794
Spartanburg	25,266	16,308	8,957	1,175
Union	1,723	-	-	257
York	82,873	-	-	-
Weighted Avg*	31,176	7,322	13,029	628



Table 24:

VALUE OF CROP COMMODITY GROUPS - COUNTY RANK IN STATE
(See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Value of All Crops	Grains & Oilseeds	Tobacco	All Cotton	Vegetables & Melons	Fruits, Nuts, & Berries	Nursery, Etc.	Christmas Trees & Woody Crops	Hay & other Crops
Cherokee	40	(D)	-	-	40	(D)	36	-	27
Greenville	18	34	-	-	8	5	7	14	17
Spartanburg	14	(D)	-	-	19	2	8	(D)	8
Union	(D)	(D)	-	-	42	(D)	(D)	-	(D)
York	(D)	31	-	23	(D)	(D)	(D)	4	10

^{*} Weighted averages are estimated based on agricultural land use area.

ECONOMIC & SOCIAL FACTORS

Table 25: VALUE OF LIVESTOCK AND POULTRY COMMODITY GROUPS - RANK IN STATE (See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Value of Livestock, poultry	Poultry, Eggs	Cattle & Calves	Milk & Dairy	Hogs & Pigs	Sheep & Goats	Horses, etc.
Cherokee	16	15	15	(D)	41	(D)	13
Greenville	33	40	14	12	27	6	6
Spartanburg	24	(D)	7	3	36	7	(D)
Union	(D)	42	(D)	(D)	45	42	35
York	(D)	(D)	5	7	(D)	5	8

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APPENDIX

Level III Common Resource Area (Ecological Region) Descriptions

Piedmont (45)

The Piedmont is an erosional terrain with some hills; the soils are generally finer-textured than those found in coastal plain regions with less sand and more clay. Piedmont soils are moderately to severely eroded; most of this region is now in planted pine or has reverted to successional pine and hardwood woodlands, with some pasture; spreading urban- and suburbanization is apparent. The Piedmont of South Carolina is divided into five level IV ecoregions: Southern Inner Piedmont (45a), Southern Outer Piedmont (45b), Carolina Slate Belt (45c), Triassic Basins (45g) and Kings Mountain (45i).

Blue Ridge (66)

The Blue Ridge is part of one of the richest temperate broadleaf forests in the world, with a high diversity of flora and fauna. Elevations generally range from 900-3000 feet, with Sassafras Mountain, the highest point in South Carolina, reaching near 3560 feet. The ecoregion in South Carolina falls within one level IV ecoregion: Southern Crystalline Ridges and Mountains (66d).

NRCS Conservation Practices used for Conservation Treatment Categories in Table 3

Report Category	Practice Codes
Buffer and Filter Strips	332, 391, 393, 412
Conservation Tillage	324, 329, 329A, 329B, 344, 484
Erosion Control	327, 328, 330, 340, 342, 561, 585, 586
Irrigation Water Management	441, 449
Nutrient Management	590
Pest Management	595
Prescribed Grazing	528, 528A
Trees and Shrubs	490, 612, 655, 656, 66
Wetlands	657, 658, 659
Wildlife Habitat	644, 645

Hydrologic Unit Numbering System

In 2005, the NRCS in cooperation with the U.S. Geological Survey, the South Carolina Department of Health and Environmental Control, and the U.S. Forest Service updated the South Carolina part of the USGS standard hydrologic unit map series. The report, "Development of a 10- and 12- Digit Hydrologic Unit Code Numbering System for South Carolina, 2005", describes and defines those efforts. The following is from the Abstract contained in that report: "A hydrologic unit map showing the subbasins, watersheds, and subwatersheds of South Carolina was developed to represent 8-, 10-, and 12-digit hydrologic unit codes, respectively. The 10- and 12-digit hydrologic unit codes replace the 11- and 14-digit hydrologic unit codes developed in a previous investigation. Additionally, substantial changes were made to the 8-digit subbasins in the South Carolina Coastal Plain. These modifications include the creation of four new subbasins and the renumbering of existing subbasins." The report may be obtained at

http://www.sc.nrcs.usda.gov/technical/HUC_report.pdf.
See Table 2 in the report for a cross-reference of old to new 8-digit HUC.

This subbasin profile uses the new HUC 8 numbering system with its modified and newly created subbasins. The NRCS reports implemented practices by 8-digit Hydrologic Unit Code. All NRCS reported Conservation Practices were reported using the older numbering system. 2005 and 2006 data were converted to the new HUC 8 numbering system through the Latitude and Longitude data reported with the applied practice. The use of these differing numbering systems has resulted in some NRCS implemented practices being credited in this report to an 8-digit HUC as reported by the NRCS but not correctly credited in the new numbering system. Likewise, the newly created 8-digit HUC will not be credited with the 2004 applied practices.